

## CLAIMS

We claim:

1. A routing cable modem termination system comprising:

a processor;

memory;

computer instructions stored in the memory and executable by the processor to perform

5 functions including:

(a) receiving an Ethernet frame from a first terminal engaged in a PPPoE connection, the Ethernet frame comprising a destination address addressing a second terminal engaged in the PPPoE connection; and

10 (b) transmitting the Ethernet frame, the destination address of the Ethernet frame addressing the second terminal engaged in the PPPoE connection.

2. The routing cable modem termination system of claim 1, wherein the destination address of the Ethernet frame is a MAC sub-layer address of the second terminal engaged in the PPPoE connection.

3. A routing cable modem termination system comprising:

a processor;

memory;

computer instructions stored in the memory and executable by the processor to perform

5 functions including:

(a) receiving an Ethernet frame from a first terminal engaged in a PPPoE connection, the Ethernet frame comprising:

an Ether\_Type field for identifying status of the PPPoE connection;

a destination address;

(b) storing the Ethernet frame on a memory;

(c) locating the Ether\_Type field in the Ethernet frame;

5 (d) determining whether a status code in the Ether\_Type field matches a discovery code or session code; and

(e) transmitting the Ethernet frame to a second terminal in response to the status code matching the discovery code or the session code, the Ethernet frame addressing the second terminal, the second terminal engaged in a PPPoE connection.

4. The routing cable modem termination system of claim 3 further comprising computer instructions stored in the memory and executable by the processor to route the Ethernet frame in response to the status code not matching the discovery code or session code.

5. The routing cable modem termination system of claim 3, wherein the destination address of the Ethernet frame is a MAC sub-layer address.

6. A routing cable modem termination system comprising:

a processor;

memory;

computer instructions stored in the memory and executable by the processor to perform

5 functions including:

(a) receiving an Ethernet frame from a first terminal, the Ethernet frame comprising:

an Ether\_Type field for identifying status of a connection;

a destination address;

(b) storing the Ethernet frame on a memory;

10 (c) locating the Ether\_Type field in the Ethernet frame;

(d) locating the destination address of the Ethernet frame;

(e) determining whether the status code in the Ether\_Type field matches a discovery code stored in the memory;

15 (f) determining whether the status code in the Ether\_Type field matches a session code stored in the memory;

(g) storing the destination address in the memory in response to the status code matching the discovery code;

(h) transmitting the Ethernet frame in response to the status code matching the discovery code, the destination address of the Ethernet frame addressing a second terminal engaged in a PPPoE connection;

(i) determining whether the destination address matches a stored address in the memory in response to the status code matching the session code; and

(j) transmitting the Ethernet frame in response to the destination address matching the stored address, the destination address of the Ethernet frame addressing the second terminal engaged in the PPPoE connection.

7. The routing cable modem termination system of claim 6, wherein the destination address in the Ethernet frame is a MAC sub-layer address.

8. The routing cable modem termination system of claim 6, wherein the stored address comprises MAC sub-layer addresses of terminals engaged in PPPoE connections.

9. The routing cable modem termination system of claim 6 further comprising computer instructions stored in the memory and executable by the processor to discard the Ethernet frame in response to (i) the destination address not matching the stored address and (ii) the status code not matching the session code.

10. The routing cable modem termination system of claim 6 further comprising computer instructions stored in the memory and executable by the processor to discard the Ethernet frame in response to (i) the status code not matching the discovery code and (ii) the status code not matching the session code.

11. A method for bridging an Ethernet frame on a routing cable modem termination system, the Ethernet frame comprising a destination address, the method comprising:

receiving the Ethernet frame from a first terminal engaged in a PPPoE connection; and

transmitting the Ethernet frame to a second terminal engaged in the PPPoE connection, the

5 destination address of the Ethernet frame addressing the second terminal.

12. A method for selectively bridging an Ethernet frame on a routing cable modem termination system, the Ethernet frame comprising a destination address and an Ether\_Type field, the method comprising:

receiving the Ethernet frame from a first terminal;

5 locating the Ether\_Type field in the Ethernet frame, the Ether\_Type field identifying status of a connection;

determining whether a status code in the Ether\_Type field matches a discovery code or a session code; and

transmitting the Ethernet frame to a second terminal in response to the status code matching  
10 the discovery code or session code, the destination address of the Ethernet frame addressing the second terminal engaged in a PPPoE connection.

13. The method of claim 13 further comprising routing the Ethernet frame in response to the status code not matching the discovery code or session code.

14. A method for selectively bridging an Ethernet frame on a routing cable modem termination system, the method comprising:

receiving an Ethernet frame from a first terminal;

5 locating an Ether\_Type field in the Ethernet frame, the Ether\_Type field identifying status of a connection;

locating a destination address in the Ethernet frame;

determining whether a status code in the Ether\_Type field matches a discovery code;

determining whether the status code in the Ether\_Type field matches a session code;

10 storing the destination address in a stored list in response to the status code matching the discovery code, the stored list comprising destination addresses of terminals engaged in PPPoE connections;

transmitting the Ethernet frame to a second terminal in response to the status code matching the discovery code, the destination address of the Ethernet frame addressing the second terminal, the second terminal engaged in a PPPoE connection;

15 determining whether the destination address of the Ethernet frame matches at least one address of the stored list in response to the status code matching the session code; and

transmitting the Ethernet frame to the second terminal in response to the destination address matching the stored address, the destination address of the Ethernet frame addressing the second terminal, the second terminal engaged in the PPPoE connection.

15. The method of claim 14 further comprising discarding the Ethernet frame in response to (i) the physical address not matching the stored address and (ii) the status code not matching the session code.

16. The method of claim 14 further comprising discarding the Ethernet frame in response to (i) the status code not matching the discovery code and (ii) the status code not matching the session code.